selling licenses to supply the markets, and also to catch with small nets for table use. This was the plan in Burmah also, while the erection of weirs was greatly restricted, or, in some regions, prohibited altogether.

Under British rule these regulations have lost force, and notions once distinct as to fishing privileges and rights have become confused. At first fishermen and fishing implements were both taxed, besides the leasing fees of the fishing-grounds. Gradually these were removed, and many fisheries were made free; but this intended boon has proved an evil, as was the case with the sea-fisheries. Now the inland fisheries are open to all. When whole districts were let to contractors, they were not so short-sighted as to permit indiscriminate destruction; but now everybody does as he likes, when he likes, and how he likes. Every device that can be thought of is called into use. As soon as the monsoon has set in, and the fry begin to move, women and children daily search for them in all the sheltered spots to which they retire for rest or hiding. Nets that would not let a mosquito pass, and even solid cloths, are used for raking out the last one of these fingerlings. So soon as fish commence moving up the rivers for the purpose of breeding, so soon begins the work of destruction, aided by every implement of capture which human ingenuity can invent, not even excepting the scooping-up of whole deposits of fresh ova, and the wholesale poisoning of streams. When the few agile survivors have succeeded in running the gauntlet of weirs, traps, wicker baskets, and nets, of every size and shape, these are all reversed, and set in waiting for their return to the sea. The rod-fishing for mahaseer, the principal game-fish of northern India, is utterly ruined in many districts. Even fishes' eggs do not escape the general hunt to which the persecuted finny-tribes are subjected; for these are collected to be made into cakes, which are thought a great delicacy.

The result of all this heedlessness and indiscriminate destruction is already apparent, and is at last exciting the anxious attention of the rulers of India. The professional fishermen of the empire have decreased in numbers, and their villages are declining into deeper and deeper poverty. In the markets fish-food commands a higher rate than naturally belongs to it, and there is prospect of its steady rise. The longer this goes on, the more fish becomes a luxury for the rich, instead of a common resource for the poor, as seems to be its natural level; and it affords to other nations, as well as India, an example of the poor policy of placing no restrictions upon the harvest of sea and river.

ERNEST INGERSOLL.

THE MOUSE-PLAGUE OF BRAZIL.

IT is well known that the fauna of America, especially that of the higher animals, presents a large number of peculiar types. Not only many of the lesser groups, but sometimes whole families of cosmopolitan orders, such as apes, opossums, etc., we find distinctly separated from those of the old world by some general peculiarity. The indigenous mice of America differ from those of the eastern hemisphere in some features of dentition, and also show a considerable variance in their habits.

The larger number of all the native species belong to a single genus, Hesperomys, of which in Brazil a dozen or more are known, differing in size from that of the ordinary mouse to that of the largest rat. They do not invade dwellings except under unusual circumstances, but mostly live in burrows of greater or less extent; some not less than seven or eight feet in length, widened at the end into a large excavation or chamber, which is filled with grass. They are omnivorous in their habits, feeding indifferently upon grass, seeds, and flesh. Their enemies are numerous, the more important of which are various snakes, and especially the tiger-cat and fox. A large dipterous insect, a bot-fly, is also parasitic upon many, the larvae of which are as large as the end of one's finger, and burrow beneath the skin.

Under ordinary circumstances they are not at all abundant, so that at times naturalists can secure specimens of many species only with difficulty. The almost inconceivable increase and abundance during certain years, to such an extent that they become a national calamity, is thus the more remarkable. In the colony of Lourenço one of these remarkable visitations has thus been described.[1] In the months of May and June, 1870, they suddenly appeared in enormous numbers. They invaded the maize-fields in such great numbers that the corn seemed literally alive with them, destroying in a few days every thing that was edible; and where, but a short time before, bushels of grain might have been harvested, not an ear remained, and the noise produced by their nibbling and climbing was audible for a considerable distance. After the corn-fields were devastated, the potatoes next received their attention. Only the largest were eaten in the ground: such as were transportable were carried away, and hidden in hollow trees or other retreats for future use. Gourds and pumpkins, even the hardest, were gnawed through and eaten. Of green food, such as clover, oats, barley, not a leaf was left standing:

[1] Zur kenntniss der brasilianischen mäuse und mäuseplagen. Dr. H. von Ihring, *Kosmos*, December, 1885.

even weeds were cut down, and the inner parts eaten out.

In the houses the struggle for existence of these long-tailed invaders was truly amazing. In many of the dwellings hundreds were killed in a single day. The cats could contribute but little aid, fighting such a plague; for not only were many of the rats so large that it would have been an unequal contest, but by their great number they drove the cats actually from the houses, not to return until the plague was passed. Nothing, except what was composed of iron, stone, or glass, was spared from their destructiveness: furniture, clothes, hats, boots, books, — every thing bore the traces of their teeth. They gnawed the hoofs of cows and horses in the stables, literally ate up fatted hogs, and often bit away the hair of persons during sleep. They penetrated all apartments, and gnawed their way through boards and walls of houses. Ditches that were dug about granaries did not suffice: the mice would climb over each other in some corner or other, and thus reach the top.

The foregoing account of one occurrence in Lourenço will suffice to show to what an extent the plague reaches. The same province had suffered similarly in 1843 and 1863, and in all probability will again in 1889. Our astonishment at the strange appearance and disappearance of such swarms of animal life is greatly increased when we perceive in what a close relation of cause and effect it stands with the presence or absence of food-supply; and probably nowhere among the vertebrate animals is the relation more apparent than here.

This food-supply is derived from the seeds of a large bamboo-grass (Taquary or Cresciuma) growing throughout Brazil. This grass grows in dense thickets to the height of thirty or forty feet, and bears a very large quantity of seed. Its natural history is remarkable. At regular intervals, varying in the different species from six to thirty years, it matures and blooms, and then disappears. Yet more remarkable is the uniformity with which it attains maturity throughout an entire province, if not the whole southern part of Brazil.

Similar plagues, though far less in extent, have occurred in Europe, in which the field-mice unaccountably appeared in greatly increased numbers. One may well think what would be the result were these little, almost insignificant creatures everywhere in such wise to take the ascendency. When one considers that on an average of every one or two months from five to eight young are born, and that these young become mature in a few months themselves, he will not be surprised to know that a single pair of the common field-mice, in the course of a single summer, would increase to twenty-three thousand individuals. Could all the conditions which now keep them in check be removed, every living thing upon the earth would be consumed in a half-dozen years.

BEE-HIVES AND BEE-HABITS.

ONE of the substantial improvements in bee-hives made in the last few years is the arrangement whereby the frames holding the combs can be quickly and easily turned up side down. The best arrangement of the several tried is where the rectangular frame holding the comb revolves on pivots fastened at the central point of the end-bars, within a half-frame just enough larger to permit the full frame to turn. The half-frame has the projecting top-bar of the usual Langstroth frame, and the half end-bars receive the pivots of the inner frame at their lower ends. Two years' experience shows me that these frames are a success.

But why this inversion of frames and combs in the hives? As is well known, bees only attach their combs firmly at top and upper portions of the lateral edges. It is probable that in past ages our honey-bees attached their combs to limbs of trees, as Apis dorsata does to-day, and as our honey-bees do in exceptional cases: hence the strong instinct to attach firmly above, slightly at the sides, and not at all below. By inverting the frames we take advantage of this habit, and secure firm attachment on all sides, thus making the combs secure for shipping, and less apt to break out when we are extracting or manipulating them for any purpose.

Another invariable habit with bees is to place their brood below the honey in the combs. Thus we always find honey at the top of the comb, and the brood at the bottom. Every bee-keeper is also aware that it is not always easy to induce the bees to leave the brood-chamber below, and pass to the sections above, when we desire to secure the comb-honey. But it is found, that if we invert our frames just as the honey harvest commences, thus throwing the honey below the brood, the bees at once, true to their instinct, pass into the sections, as they wish honey above their brood; and so we not only get the freshly gathered stores, but the honey previously stored in the brood-chamber carried into the sections above, just where we desire it, and all space below vacated for the brood, which is also desirable.

Not only is it desirable to invert the brood-frames, but the sections as well. This secures more firm attachment of the combs in the sec-